

<div>Unit 1</div> <div>Aug 20-Oct 12</div> <div>(39 days)</div>	<div>Order of Operations and Whole Numbers</div> <div>Rationale, Strategies, Essential Questions, and Misconceptions</div>							
WORKSHOP MODEL OF INSTRUCTION								
<div>Warm Ups</div>	<div>WORKTIME Lessons</div>		<div>CLOSURE Choices</div>					
<div>Number Talks</div> <div>Addition</div> <div>Weeks 1-3</div> <div>Weeks 4-6</div> <div>Week 7-10</div> <div>Multiplication</div> <div>Weeks 1-3</div> <div>Weeks 4-6</div> <div>Weeks 7-10</div> <div>Division</div> <div>Weeks 1-3</div>	<table><tr><th>Scaffolding Lesson (SL)</th><th>Constructing Lesson (CL)</th><th>Exercises (E)</th></tr><tr><td>A lesson that builds or recalls the prerequisite knowledge for the standard</td><td>A lesson to construct understanding of the standard through a deep/rich problem-solving task (usually contextual)</td><td>Games or activities that reinforce and deepen understanding of the standard to the point of mastery</td></tr></table> <div>Unit 1 Part 1</div> <div>5.OA.15.OA.2</div> <div>Students take Pre-assessment for Unit 1</div> <div>LESSON 1 (SL/CL)</div> <div>How Many Dots?</div> <div>This third grade lesson is being recycled to focus on students' written equations and expressions. The representation for the solution for counting the dots must correspond with the written symbols and numerals students use to explain their strategy. Students must learn how to write and interpret symbols and numbers. (literacy in mathematics).</div> <div>Student sheets and practice</div> <div>Problem 1 Presentation for lesson (for Smartboard) Student Worksheet Solutions</div> <div>Problem 2 Presentation for lesson (for Smartboard) Student Worksheet Solutions (E if needed)</div>	Scaffolding Lesson (SL)	Constructing Lesson (CL)	Exercises (E)	A lesson that builds or recalls the prerequisite knowledge for the standard	A lesson to construct understanding of the standard through a deep/rich problem-solving task (usually contextual)	Games or activities that reinforce and deepen understanding of the standard to the point of mastery	<div>ARTICLE</div> <div>gives a description of each of the following</div> <div><ul style="list-style-type: none">• Gallery walk• Math Congress• Discussion and Communication during the closure• Summarizing</div> <div>Article: Generating Math Talk (from Math Solutions)</div> <div>Math Notebook/Journal</div> <div>Students should keep a record of all their work in a composition book, preferably one with graph paper.</div> <div>Each day the journal or notebook should be dated. All notes</div>
Scaffolding Lesson (SL)	Constructing Lesson (CL)	Exercises (E)						
A lesson that builds or recalls the prerequisite knowledge for the standard	A lesson to construct understanding of the standard through a deep/rich problem-solving task (usually contextual)	Games or activities that reinforce and deepen understanding of the standard to the point of mastery						

LESSON 2 (CL) will later be used for exercises

Introduction to order of operations: focus on WHY you have to multiply first

<http://www.eduplace.com/math/mathsteps/4/a/4.orderop.tips.html>

LESSON 3 (CL)

Non-routine Problem-solving sets

Students solve non-routine problems requiring an equation with 2 operations. Students must correctly write the equation to match the solution. Differentiate instruction through numbers or complexity of problem. Other number pairs for problems are given.

FOCUS: writing an accurate equation for the solution...is there more than one way to write it?

Leveled Problem: *(written by Grayson Wheatley, Mathematics Learning)*

One year Maria and Sonia send greeting cards. Altogether they send 25 cards. Maria sends 7 more cards than Sonia. How many cards does each girl send?

Other number choices: (80, 10) (96, 6) (150, 16) (385, 101)

LESSON 4 (CL)

Analyzing equations to determine if the structure of the written equation matches the situation

"Everything Balances Out in the End" • lesson 2 in the series • click on website below
<http://illuminations.nctm.org/LessonDetail.aspx?ID=L643>

[Pan Balance - Numbers Applet](#). Good for SMARTboard or computer lab

Student Sheets [Who is correct?](#) [Discover Oops](#)

and all work should be recorded in this book.

The first 4 or 5 pages should be skipped for the table of contents.

This journal becomes an important study guide for students and a formative assessment tool for the teacher.

After each lesson during the last 5 minutes students should reflect using these prompts like the following:

1. Today I learned:
2. This connects/adds to what I know about:
3. What I learned today can help me later when:

Also, journals can be used as a quick assessment tool. For example, a simple problem can be given to see what students understood for the lesson that day.

LESSONS 5 (CL) *will later be used for exercises*

Form and solve simple linear equations.

This resource is divided into 4 sessions. These lessons help students understand how to generate and write expressions and equations accurately both in words and numbers and symbols in a fun and challenging way.

Session 1 and 2 – [Target 12 and Target 24](#)

Session 3 and 4 – [Four Fours Challenge](#)

LESSON 6 (CL) *will later be used for exercises*

[Pick a Number,](#) Lessons for Algebraic Thinking, Grades 3-5, pp. 139-150 (writing equations, properties, inverse operations) one day for intro; more days for extensions.

This lesson gives students experience with solving equations. Students each pick a number between zero and twenty-five and use it with the following directions: Multiply the number by two and then add seven. Students present their result and the others figure out what their starting number was and explain their strategies. They practice with others and write their own. Full lesson is scripted in the link.

LESSON 7 (E)

Creating a treasure map with order of operations. Students generate equations for a given value. <http://www.uen.org/Lessonplan/preview.cgi?LPid=21529>

LESSON 8 (CL) *will later be used for exercises*

More practice playing with numbers and operations to make true statements. Students

[Number Juggle 1](#)

[Number Juggle 2](#)

[Number Juggle 3](#)

[Number Juggle 4](#) (in your back pocket)

LESSON 9 (E)

Menu/Game Day Students work in small groups to engage in more practice of concepts. Prescribe based on needs of students. Pull back small groups for intensive work.

Possible Choices: Games: **Four Fours Challenge or Target 24**) • More practice with **grouping dots and writing expressions** to match ([million dot student worksheet](#)) • Extensions from **Pick a Number**(see original lesson) • Non-routine **Problem-solving** – give similar problem as in lesson 3- Problem: Troy and Suzy are collecting trading cards. Together they have 64 cards. Troy has 6 more cards than Suzy. How many cards does each have? • [Number Juggle 5](#)

Interim Assessment

Students take 10 question interim assessment. Implement using the workshop model. Students work individually. Grade assessment the same day, in class, to give immediate feedback. Students justify and defend their solutions.

LESSON 10 (CL) *will later be used for exercises*

Interpreting a growing pattern; writing the corresponding expression; interpreting multiplicative situation without always finding the total (more of 5.0A.2 – deeper)

The patterns in this visual model help to focus on the concept of interpreting the magnitude or scaling of a figure using color tile arrangements that emphasize the growing multiplicative situation. Students represent the pattern using tables and equations. This lesson will be revisited in Unit 4 and at that time the graphing piece will be introduced.

[Piles of Tiles](#)

LESSON 11 (CL) *will later be used for exercises*

In this problem-solving activity, students must use multiple operations and numbers to complete Magic Square or in this case, Hives.

Focus on the strategies students use to use all the numbers.

Student worksheets: [Hive Jive Sheets 1-4](#) (graduate in level of difficulty)

Unit 1, Part 2

5.NBT.5 5.NBT.6

IMPORTANT: Begin multiplication and division number talks

LESSON 12 (SL/CL)

Area model understanding of 2-digit x 1 digit and 2-digit x 2 digit multiplication problems · Use rectangular multiplication tool for warm-up (see warm-ups for link).

Focus on structure of the distributive property. How do the operations work? See the lesson for more questions and tips. Students will need lots of practice and discussion to make sense of the partial products and to be able to explain why the standard algorithm works every time.

Virtual manipulatives – [National Library of Virtual Manipulatives](#) – [rectangle multiplication](#) (the lattice version works well for distributive property, the common version works well for analyzing powers of ten and what is happening.

[Lesson](#) from Illuminations (NCTM)

Student Worksheets [2 digit x 1 digit worksheet](#) [2 digit x 2 digit worksheet](#)

LESSON 13 (CL)

Students will work with area problems.

[The distributive property and multiplication](#)

LESSON 14 (CL)

Students continue to work with area problems

Focus on place value, the distributive property to deepen understanding of the structure of multiplication with 2 digit numbers using the area model (base 10 blocks and/or graph paper)

PROBLEM

A dog pen in the shape of a rectangle is to be built so that the width is 38 feet and the length is 62 feet.

What is the area of the dog pen?
Other number choices: (30, 60) (25, 75)

Lessons 15 (CL) Adopted from Catherine Twomey Fosnot materials (Investigating Multiplication and Division)

Graph Paper Arrays – Commutative Property and Doubling; Focus on structure

Mental math lesson – Students first work problems out mentally – whole class; students share out and explain their reasoning. Students will cut out graph paper to explain the relationships between expressions – How does knowing 3×8 help me compute 16×3 ? Have students begin with another problem, for example 2×7 . They create the same relationships to explain the doubling strategy. Students create graph paper arrays to explain.

1. 3×8
2. 16×3
3. 6×16
4. 16×12
5. 6×32
6. 64×3
7. 6×64

Lesson 16-18, and 21 are from Investigations: Building on Numbers You Know, Grade 5 (1999)

Lesson 16 (CL)

Introductory Problems for Division – Students devise strategies to determine solutions. Focus on the structure of the problems and what to do with the remainder. How are the problems the same? How are they different? Why?

[Juice Problems](#)

Lesson 17 (CL)

Students revisit the division situations and look again at structure and the use of the remainder based on context of the problem.

[Division Situations](#)

Lesson 18 (CL)

INVESTIGATIONS: BUILDING ON NUMBERS YOU KNOW

Investigation 3, Sessions 4-6, pp. 83-88 ([Division Clusters](#))

[Student Sheet 1](#) (cut the problems apart so students can focus on one set at a time)

[Student Sheet 2](#) (using multiplication to think about division)

Lesson 19 (E)

Games/Menu Tasks – Continue games and activities for practices on concepts; work with small groups

Choices: [Counting Up From 10,000](#) (new) • Game -Target 24 • More practice with grouping dots and writing expressions to match ([million dot student worksheet](#)) • Extensions from Pick a Number (see original lesson) • [Hive Jives 4 and 5](#)

Lesson 20 (E)

Non-routine Problem Solving – focus on the properties and operations used in student strategies

Mary said the product of three numbers is 400 and their sum is 23. What are the three numbers? Other number choices: (72, 17) (6782, 57)

Extension: Students create their own problem to give to others

Lesson 21 (E)

More practice with related problems

[How Did I Solve It](#)

Lesson 22 (CL) *will later be used for exercises*

Students practice writing contextual problems to go with 2 operation expressions.

Great formative assessment

Example: $(5 \times 20) + 2$

Created context: James had in his wallet 5 twenty dollar bills plus 2 one dollar bills for a total of 102 dollars.

Other possible expressions:

$$(4 \times 90) - 60$$

$$6 + 4 \times 8$$

$$(10 + 5) \times (5 + 6)$$

Lessons 23 (CL)

Non-routine Problem (from Developing Mathematical Fluency, p. 39, #8 and p. 50, #29)

You can buy 12 tickets for the park for \$15.00 or 20 tickets for \$23.00. Which is the better buy?

“Back pocket” problem: p. 50, #29 or have other comparison problems ready.

Lesson 24 (CL)

Non-Routine Problem (from Developing Mathematical Fluency, p. 43, #16)

Antwon and Erik are collecting baseball cards. Together they have 62 cards. Antwon has 8 more cards than Erik.

- How many cards does each have?
- A month later they have 86 cards and Antwon has 12 more cards than Erik. How many does each have now?
- Suppose they have 11, 238 cards and Antwon had 341 more cards than Erik?

Lesson 25 (E)

(DO NOT RUSH! Take your time through constructing lessons; they may take one day or they may take 3 days. Base the time on students' progress. Also, science lessons that match the mathematics can be used to build more connections and understanding of the standards.)

Choose more lesson extensions, games, and practice to solidify students' understanding of the four standards in Unit 1. During this last week or two, prescribe practice to students based on their areas of need. There is a bank of problems in the box below. Pull back small groups for more intense work/intervention with identified students. Whole group discussions with students explaining and justifying their thinking is critical.

More Resources for practice/centers:

[More Non-Routine Word Problems](#)

[Number Juggles 6-8](#)

[Hive Jive 5-6](#)

[Hive Jive 7-8](#)

[Mystery Numbers 1-3](#)

[Mystery Numbers 4-5](#)

[Mystery Numbers 6-8](#)

[Division Situations](#)

Other:

Continue giving more 2 digit multiplication and division problems for students in which students explain the structure.....like in Lesson 12, 13, and 21.

Summative Assessment of Unit 1

The pre-test becomes the post-test.

Compare results.

Students should self-assess their areas of strength and areas of weakness.

ASSESSMENT	ESSENTIAL QUESTIONS	VOCABULARY	INTERVENTIONS	HOMEWORK IDEAS
Unit 1 Pre- and Post-test (summative) Solutions Interim Assessment Solutions	<p>How are math expressions written to explain or model a real-life situation?</p> <p>What are the reasons for the order of operations?</p> <p>What do parentheses mean when writing mathematics?</p> <p>What does it mean to evaluate an expression?</p> <p>What is the difference between an expression and equation?</p> <p>What strategies can be used to determine how numbers or expressions of numbers are related?</p> <p>What is the structure of a multiplication algorithm?</p> <p>SCIENCE LESSONS</p>	<p><u>Unit 1</u></p> <ol style="list-style-type: none"> algorithm area model array associative property calculation commutative property compare distributive property evaluate expression order of operations parentheses structure <p>Strategy for teaching vocabulary in math</p>	<p>Students may need to work on fluency with basic facts. These games will give them lots of practice.</p> <ul style="list-style-type: none"> • Salute can be played using missing addend or missing factor • Game of Leftovers division game with remainders • Rio fluency of multiplication facts; able to focus on one multiplier, especially one giving the student difficulty • Oh, no! 99! Addition and subtraction fluency <p>Article by Constance Kamii (<i>Teaching Children Mathematics</i>, 2003) Multiplication Games</p> <p>Explicit instruction on the distributive property and the patterns of the multiplication algorithm Visualizing Multiplication</p>	<p>See the extra resources at the bottom of the unit.</p> <p>Make sure the homework given is an exercise and not a constructing lesson.</p> <p>Homework is for practice only or for an extension for students who are highly engaged with a concept.</p> <p>Games are a great assignment as they can involve family members and is fun!</p>

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